DOCUMENT RESUME

ED 162 735 PS 010 215

AUTHOR Behr, George
TITLE Research Based Considerations for Effective Program Implementation.
INSTITUTION Southwest Regional Laboratory for Educational Research and Development, Los Alamitos, Calif.
PUB DATE Mar 78
NOTE 18p.; Paper presented at the Annual Meeting of the American Educational Research Association (Toronto, Canada, March 27-31, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Educational Accountability; Educational Facilities; Educational Opportunities; Elementary Secondary Education; *Instructional Improvement; *Program Development; *Program Effectiveness; *School Administration; School Improvement; *School Schedules; School Systems; Time Blocks

ABSTRACT

This paper examines practices under school control that have an impact on the allocation and expenditure of instructional time, and offers research based considerations for effective program implementation. Research literature sources and data sets are used as a basis for examining: pacing of instruction, uses of common textbook instruction, productive instructional time, initiation of instruction at the beginning of the school year and placement of pupils for instruction. It is suggested that program implementation can be effective if it incorporates the movements toward minimal competency testing, individualized educational programs, increased dissemination of outcome-based instructional systems, and a general increasing desire for school accountability, as these movements force decisions concerning what to teach, given available resources. Three requisites for accountable schooling are established: (1) measurement instruments sensitive to the instructional programs and goals of the school; (2) measurement devices and procedures for describing the learning opportunities provided by the school (e.g., placement, time spent on instruction); and (3) a mechanism for gathering and making this information accessible to parties responsible for making decisions about and for the school. (Author/CM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
George Behr
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

RESEARCH BASED CONSIDERATIONS FOR EFFECTIVE PROGRAM IMPLEMENTATION[1]

ED162735

George Behr

SWRL Educational Research and Development

Pupils achieve in school subjects what they have an opportunity to learn. Common sense makes this statement a truism, and the research literature confirms it. But, the school community and the R&D community are only beginning to grasp the profundity of the statement for their operations.

The empirical verification of the assertion that children learn what they have an opportunity to learn has accumulated during the last decade in the findings of several significant studies. For example, the National Longitudinal Study of Mathematical Abilities (Wilson, Cahen & Begle, 1968-72) examined the grade four through twelve achievement of over 100,000 pupils in 1,500 schools in 40 states.

> One of the clearest conclusions to be drawn from the results is that student achievement, to a substantial extent, mirrors the content treated in the textbook: students are more likely to learn what they have been taught than something else [Vol. 12, p. 82].

The International Study of Achievement in Mathematics yielded similar results. They asked teachers to indicate whether each test item dealt with topics that had been included in the pupils' instruction. This variable, called "opportunity to learn," correlates .64, .73, .80, and .40 with the total mathematics achievement for the four populations studied. It was concluded that ". . . students have scored higher marks in

PS010215

---

[1]Paper presented at the annual meeting of the American Educational Research Association, Toronto, Canada, 1978. (Session 29.14)

countries where the tests have been considered by the teachers to be more appropriate to the experience of their student [Husén, 1967, Vol. II, p. 168]."

In the International Studies in Evaluation series, Carroll (1975) reports correlations ranging from .59 to .82 between test scores and amount of instruction. Stallings (1976) found most test score differences were accounted for by classroom instructional practices related to the quantity and quality of the learning opportunities. In the 18 studies reviewed by Bloom (1976), he found average correlations of 0.42 between pupil participation and final achievement and an average correlation of 0.58 between pupil participation and gain in achievement.

In a similar fashion, SWRL's programmatic R&D efforts over the past five years have yielded comparable results. SWRL's Proficiency Verification System (PVS) is a research inquiry and product that has carefully analyzed the major reading and mathematics textbook series for grades K through 6. It provides an assessment/scoring/reporting system that is keyed to this textbook context. Data from over 20,000 pupils in 76 schools shows clearly that pupil proficiency on textbook outcomes is directly related to the percentage of lessons in the instructional curriculum dedicated to the outcomes (Buchanan & Milazzo, 1978).

Also, data from the five year installation of the SWRL/Ginn Kindergarten Program conclusively show that pupil proficiency is directly related to the amount of program instruction received. Pupil attainment of the Kindergarten Program outcomes increases as students cumulatively progress through the program (Hanson & Schutz, 1976). That is, achievement increases directly with the opportunity to learn.

The lesson is that formal schooling does teach pupils. Pupils can and do achieve the things that they are taught. Programmatic educational R&D can and does produce instructional product systems that promote pupil learning. In particular, within the basic skills areas of elementary school, existing technology has produced product systems that do produce replicable, high-achievement student learnings (Anastasiow, Hanson & Behr, 1978; Buchanan & Milazzo, 1978; Hanson, Behr & Bailey, 1975; Hanson & Schutz, 1976; Hanson, Schutz & Bailey, 1977). The productivity of curricula is noted by Walker and Schaffarzick (1974).

> We begin as people always begin, naively, to look for signs of superiority of innovative curricula over traditional curricula. What we found was not superiority, but parity: each curriculum did better on the distinctive parts of its own program, and each did about equally well on the parts they held in common. Although this result is disappointing to those of us who hoped to find a royal road to learning superior to the footpaths we have heretofore been forced to use, it contains a ray of hope. It assures us that the application of funded wisdom to the creation and use of curriculum materials is generally producing a pattern of academic achievement consistent with the intentions of curriculum developers. It also alerts us to a powerful tool for securing the learning of the content we want pupils to learn: inclusion of the material to be learned in the school curriculum [pp. 108-109].

Naturally there are evaluation issues as to whether or not one program will "teach" something better or more efficiently than another or whether alternative teaching/program strategies produce higher achievement on the same content. But such inquiry is merely fine-tuning of production machinery. Of much greater importance for effective program implementation are two complementary and intertwined issues. One is describing and identifying what is to be taught. The other is enhancing the opportunity to learn this content by managing/assigning/prioritizing resources to produce these opportunities.

Schools must decide what pupil learnings they want to promote. And they must express those desired learnings in terms of instructional program resources that achieve these goals. As goals become less clear, less well defined, the basis erodes for justifying resources and crediting accomplishments. In fact, resources and opportunities become diluted as more, different, and less well-defined goals are embraced by the school.

PVS data verify that this thinning out process occurs. Content in standard mathematics textbook series increases in volume and complexity from grades 1 through 6. Successive grade level texts contain successively more lessons. The textbooks for grades 1 through 6 contain, on the average, 122, 130, 150, 160, 160, and 160 lessons, respectively (Buchanan & Milazzo, 1978). However, the time schools allocate to instruction remains substantially the same across the six years.[2] When one compares pupil achievement to relative instructional emphasis as defined by the percentage of the text devoted to an instructional topic, one sees a direct relationship between the two. The more emphasis, the better the pupils achieve. Clearly, uncritical acceptance of textbook instruction dilutes the school's teaching resources and restricts the pupils' opportunities to learn. More selective use of textbook resources might identify the desired instructional elements and focus time and resources to achieve those elements.

---

[2]Though there is a slight increase of 5 to 10 minutes allocated to instruction as one moves from grades 1 and 2 to grades 3 through 7 (Graeber, Rim & Unks, 1977; McDonald, 1975; Conference Board of the Mathematical Sciences, 1975), it does not compensate for the conjoint increase in volume and difficulty of the content (Buchanan & Milazzo, 1978).

Thus, in defining effective instructional program implementation, particularly in the basic skills areas in elementary school, one should put aside achievement scores and concentrate upon the opportunities to learn what has been decided to be taught. If pupils are provided the opportunity to learn, they will learn and achievement scores will reflect this learning. In this perspective the variable "opportunity to learn" is the manipulable, independent variable. The dependent variable is then the amount learned--i.e., content learned, number of learning tasks completed, etc. Consequently, the instructional goal is to optimize the dependent variable, the amount learned (that which the school is to take credit for), through manipulations of the independent variable, the opportunity to learn.

Opportunity to learn basically means that sufficient instructional time is expended to achieve the desired learning.[3] Minimally, this is defined as the amount of time needed to learn which, in turn, is a function of the quality of instruction. That is, a certain amount of elapsed time is needed to provide all necessary pupil participation, practice, instructional cues, reinforcement, feedback, correctives, etc. Naturally, some instructional programs, instructional management arrangements, and other teacher and school practices may be more or less efficient--i.e., faster or slower, more or less expensive, etc.--than others in producing these learnings.

McDonald (1975) distinguishes between allocated and productive time. Allocated time is the time the teacher schedules/conducts/supervises

---

[3]For efficiency, one assumes that the pupil possesses the necessary prerequisite skills and learnings.

instruction, while productive time is the time a pupil is actively engaged in learning tasks.[4] He shows that pupils were engaged for about 70 percent of the allocated time. And, in grades 2 and 5, the median productive minutes per day is less than 30 for reading and 25 for mathematics. Though it is not known how much productive time is necessary for full learning, it does not appear that pupils are currently being overwhelmed with practice in the basic skills.

Naturally one would like to maximize the amount of productive time across a school year. Obviously, the total of productive time is bounded by the total of the allocated time. Thus, curriculum and school practices that constrain or restrict allocated time or use it inefficiently must restrict productive time, other things being equal.

There are three obvious factors somewhat under school control that influence the total allocated and productive time. These are (1) availability of appropriate instructional program materials, (2) the start-up of program instruction, and (3) appropriate initial pupil placement for instruction.

The first issue, the unavailability or the delayed delivery of instructional program materials is, a priori, an implementation concern. It not only invites teacher and administrator frustration and anger, but, given the current practice of a fixed instructional school year of about 40 calendar weeks, any delays in receiving materials simply reduce the total time available for instruction relative to those materials proportional to the length of the delay. Though it may be that the time

---

[4] Rosenshine (1977) terms this variable "academic engaged time."

spent per day or week can be increased to compensate for the lost time, there is little evidence that this takes place. In general, the degrees of freedom in instructional delivery are proportionately reduced by late delivery of materials.

The second implementation concern relates to the delay between the start of school (i.e., first day of school) and the start of program instruction. The effect of delaying the start of instruction is the same as a delay in receiving materials: instructional days and weeks are lost. Data from the 1974-75 school year implementation of the SWRL/Ginn Reading Program, for example, indicate that delays between the first day of school and the onset of program instruction ranged from zero to twelve or more weeks (Behr & Hanson, 1977). Further, the preliminary evidence is that these effects are not random. Table 1 shows the distribution of start-up delay time (i.e., the difference between the first day of school and the first day of program instruction) in calendar weeks for classes with various biographic characteristics. The data indicate that there can be a selective and substantial lag between the start of school and the start of program instruction. That is, classes in the first listed category under each biographic attribute--income level below $8,000, reading level below national norms, eligible for Title I, inner city school locations, black ethnicity--exhibit a tendency to begin reading instruction later in the school year than classes in the latter listed categories--family income level above $12,000, reading level above national norms, not eligible for Title I, suburban school location, other (white) ethnicity.

Table 1

Distribution of Start-up Delay Time in Weeks for Reading Classes

Biographic Characteristics	Weeks Delay										
	≤3 wks		4-7 wks			8-11 wks			≥12 wks		
Income Level:	N	%	N	%	Cum.%	N	%	Cum.%	N	%	Cum.%
Below $8,000 (263)*	32	12	122	46	58	91	35	93	18	07	100
8-12,000 (68)	40	59	12	18	77	1	01	78	15	22	100
Above 12,000 (46)	34	74	10	22	96	0	00	96	2	04	100
Reading Norm:											
Below (291)	53	18	126	43	61	91	31	92	21	07	100
At (51)	24	47	9	18	65	3	06	71	15	29	100
Above (57)	43	75	13	23	98	0	00	98	1	02	100
Title I Eligibility:											
Eligible (277)	44	16	127	46	62	91	33	95	15	05	100
Not Eligible (122)	76	62	21	17	79	3	02	81	22	18	100
School Location:											
Inner City (247)	24	10	121	49	59	91	37	96	11	04	100
Urban (51)	31	61	4	08	69	1	02	71	15	29	100
Suburban (98)	65	66	20	20	86	2	02	88	11	11	100
Ethnicity:											
Black (172)	27	16	74	43	59	63	37	96	8	05	100
Spanish (22)	0	00	20	91	91	0	00	91	2	09	100
Heterogeneous (12)	11	92	0	00	92	1	08	100	0	00	100
Others (193)	82	42	54	28	70	30	16	86	27	14	100

*Total number of classes

Table 2

Recommended Versus Actual Pupil Placement in LCS

Recommended		Actual	
Entry	N	Unit 1	Unit 9
Unit 1	1168	1063 (91%)	105 (9%)
Unit 9	626	252 (41%)	370 (59%)
Out of LCS*	209	58 (28%)	151 (72%)

*Data were not available for those pupils that were recommended as "out of LCS" and who, in fact, were not placed in LCS.

The third implementation concern is that of faulty placement, which also results in lost instructional time. If a pupil is underplaced within an instructional program, then time is wasted by instructing the pupil on outcomes that have already been achieved. If a pupil is overplaced, then instruction is either inefficient or ineffectual and instructional pacing is slowed.[5] However, given current classroom management practices, total pupil individualization relative to pupil learning needs is not a common procedure. Given that instructional grouping in from one to four groups is the common practice and that there is wide variability in the entering proficiencies of pupils, some misplacement is to be expected. That is, in a classroom of 30 pupils one would expect that the range of entering pupil proficiencies would be greater than could be accommodated in four groups without some misplacement. Obviously, some trade-off has to be made between instructional management considerations and total misplacement.

Two independent data sources provide evidence that teachers exhibit a tendency to underplace pupils. In the 1973-74 installation of the English Language and Concepts Program for Spanish-Speaking Children (LCS), data were collected concerning the agreement between LCS Program placement as recommended by the LCS Placement Aid and the actual placement of pupils as exercised by teachers (Hanson & Bailey, 1975). LCS consists of 15 units of instruction with two placement entry points into the program, units 1 and 9, respectively. A third placement category of "does not need LCS instruction" is also provided by the Placement Aid.

[5]Misplacement affects the methodology of instructional observation systems. In particular, observed productive time must be interpreted relative to the appropriateness of the instruction.

Table 2 arrays the agreement between recommended and actual placement. The data show that 41% of those recommended for the higher placement entry, unit 9, were actually placed at the lower entry point unit 1. Further, for 209 pupils recommended as not needing LCS instruction, 58 were actually placed at the very beginning of the program while 151 were actually entered at unit 9.

Limited data from the 1973-74 school year implementation of the SWRL Reading Program (Hanson, Behr & Bailey, 1975) also indicate a degree of underplacement. For that year a prototype placement test for reading was provided to participants. The placement test was administered at the beginning of the school year and a suggested entry or placement block[6] of the reading program was suggested for each pupil. These data were later compared with the actual entry or placement block as indicated on class record sheets maintained by the teacher and collected by SWRL at the end of the school year. Figure 1 shows that the actual placement block is systematically lower than the suggested block. That is, either (1) pupils tended to be underplaced, or (2) the prototypic test tended to overplace pupils. Table 3 breaks out the placement patterns by biographic characteristics. Again, for each biographic attribute, underplacement is more pronounced in the first listed categories of each attribute than in the later listed categories.

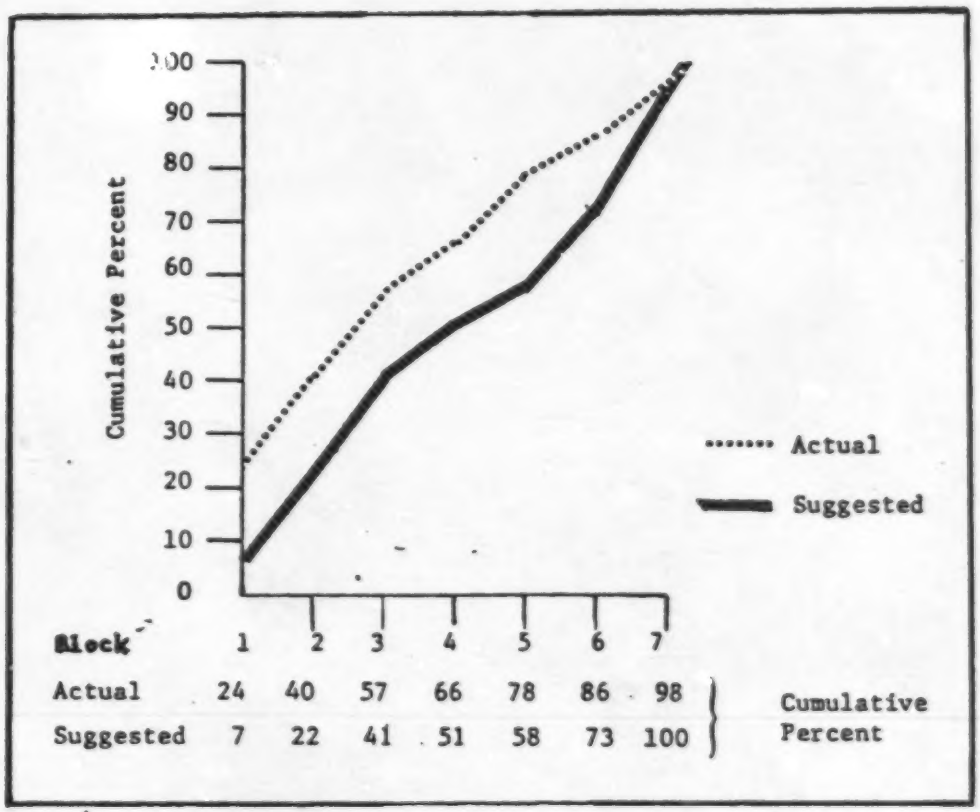
Effective program implementation then requires some hard decisions and some hard information. The hard decisions are what to teach given

---

[6]The SWRL Reading Program is divided into eight consecutive blocks. Each block very roughly corresponds to about a half-year's worth of instruction. Blocks are further subdivided into units and units into lessons or activities.

Figure 1

Actual and Suggested Placement of Pupils
in the Reading Program in 34 Schools



Block	1	2	3	4	5	6	7
Actual	24	40	57	66	78	86	98
Suggested	7	22	41	51	58	73	100

Cumulative Percent

Table 3

Actual and Suggested Reading Block Placement Distribution in Percent

Biographic Characteristic	Actual* Suggested	Program Entry Points 1	2	3	4	5	6	7	Mean Entry Point
ETHNICITY									
Black	A	47	21	23	9	0	0	0	1.9
(N = 3)**	S	16	13	28	15	10	12	6	3.5
Spanish-surnamed	A	31	34	34	0	0	0	0	2.0
(N = 1)	S	14	12	29	15	9	12	10	3.7
Other	A	19	16	15	10	14	9	16	3.8
(N = 20)	S	4	14	17	10	6	16	33	4.7
INCOME LEVEL									
Less than $5,000	A	67	22	11	0	0	0	0	1.4
(N = 1)	S	15	16	32	10	9	11	7	3.4
5,000 - 8,000	A	38	23	24	8	2	3	2	2.3
(N = 4)	S	13	13	26	15	9	13	12	3.8
8,000 - 12,000	A	21	17	22	15	9	5	11	3.3
(N = 9)	S	6	18	17	8	7	16	28	4.5
Greater than $12,000	A	16	15	10	7	18	12	20	4.2
(N = 11)	S	3	11	17	12	6	16	36	5.0
NATIONAL READING NORMS									
Below	A	26	23	31	15	1	0	4	2.6
(N = 6)	S	12	15	22	13	9	14	16	4.0
At	A	36	16	7	9	13	3	15	3.2
(N = 4)	S	7	17	22	9	7	16	23	4.4
Above	A	19	15	13	8	15	11	16	3.9
(N = 15)	S	4	13	18	10	6	15	35	4.9
TITLE I ELIGIBILITY									
Eligible (YES)	A	34	25	29	10	0	0	2	2.3
(N = 6)	S	13	14	24	13	9	14	14	3.9
Not eligible (NO)	A	20	15	13	10	15	10	17	3.8
(N = 19)	S	4	14	18	10	6	15	33	4.8

* Actual placement distributions may total less than 100% since pupils actually placed in Block 8 are not included in this table. This was done to conform to the seven entry points, Blocks 1-7, provided by the placement test.

** Number of Schools

the available resources. The movements toward minimal competency testing, individualized educational programs (e.g., special education and PL-942), increased dissemination of outcome-based instructional systems, and the general increasing desire for school accountability are forcing these hard decisions to be made. They must be explicitly made and promoted aggressively.

Schools must tell their public about their accomplishments. But to do so they need hard information about their accomplishments. To gather and accumulate this information, they need (1) measurement instruments sensitive to their instructional programs and goals, (2) measurement devices and procedures for describing the opportunities to learn provided by the school (e.g., placement, program start-up, time spent on instruction, etc.), and (3) a mechanism for gathering and making accessible this information to parties responsible for making decisions about and for the school. Let's look a little closer at these three foundational points for accountable schooling.

Measures of instructional accomplishments specific to the outcomes of an instructional program are the only fair means for communicating achievement scores to audiences outside the classroom. Analytic and empirical evidence clearly show that traditional standardized achievement tests do not accurately reflect the outcomes of instructional programs (Armbruster, Stevens & Rosenshine, 1977; Perkins & Buchanan, 1978; Jenkins & Perez, 1976; Follettie, 1976; Popham, 1975; Porter, Schmidt, Floden & Freeman, 1977).

Schools must (and do) explicitly plan opportunities to learn. But these too must be measured and monitored. For placement purposes

program specific placement instruments are necessary. For both planning and monitoring courses of study, instructional time must be effectively allocated and managed. Such decisions and operations are best made on the basis of hard data, on the basis of knowing the time and resources required to achieve desired goals, on the measurement and observation of the various characteristics impacting the opportunities to learn.

Lastly, an information system mechanism must be implemented to gather, analyze, and make accessible the schooling information to appropriate school personnel. Several such systems have been conceptualized and operationalized (see Behr & Hanson, 1977; Buchanan & Milazzo, 1977). These information systems fulfill several necessary functions. They provide a basis for planning schooling, for realistically allocating resources to achieve desired instructional goals, for monitoring progress toward those goals, and, in the limit, for costing-out school attainments. Such information systems then provide the basis for firmly crediting school accomplishments to a variety of audiences--parents, school boards, legislatures, etc.

Significant evidence supports the common sense observation that schools do systematically produce pupil achievements. The evidence further shows that the achievement is directly related to the pupils' opportunity to learn. Because the school's proper function is to provide the learning environment, the opportunities to learn, it must carefully focus its attention and resources on describing, defining, and implementing these opportunities. Then, it can precisely describe, justify, and take credit for its accomplishments.

References

Anastasiow, M.A., Hanson, R.A., & Behr, G.E. SWRL/Ginn Communication Skills Programs: Descriptive summary of quality assurance information for 1975-76 (Technical Report 61). Los Alamitos, California: SWRL Educational Research and Development, 1978.

Armbruster, B.B., Stevens, R.J., & Rosenshine, B.V. Analyzing content coverage and emphasis: A study of three curricula and two tests (Technical Report No. 26). University of Illinois, Urbana, Illinois: Center for the Study of Reading, March 1977.

Behr, G.E., & Hanson, R.A. Supporting program implementation. Paper presented at the annual meeting of the American Educational Research Association, New York, April 1977.

Bloom, B.S. Human characteristics and school learning. New York: McGraw-Hill, 1976.

Buchanan, A.D., & Milazzo, P.M. Patterns in K-6 mathematics instruction and achievement (Technical Report in press). SWRL Educational Research and Development, Los Alamitos, California, 1978.

Buchanan, A.D., & Milazzo, P.A. Designing an instruction-referenced system for large-scale evaluation of school achievement. Paper presented at the third annual conference of the California Society of Educational Program Auditors and Evaluators, Los Angeles, May 1977.

Carroll, J.B. The teaching of French as a foreign language in eight countries. International Studies in Evaluation, Vol. 9. New York/Stockholm: John Wily/Almquist & Wiksell, 1975.

Conference Board of the Mathematical Sciences. Overview and analysis of school mathematics grades K-12. Washington, DC: Author, 1975.

Follettie, J. Achievement information monitoring in schools (AIMS): Larger-straws in the winds of change (Professional Paper 36). Los Alamitos, California: SWRL Educational Research and Development, May 1976.

Graeber, A.O., Rim D., & Unks, N.J. A survey of classroom practices in mathematics: Reports of first, third, fifth, and seventh grade teachers in Delaware, New Jersey, and Pennsylvania. Philadelphia, PA: Research for Better Schools, Inc., June 22, 1977.

Hanson, R.A., & Bailey, J.D. LCS quality assurance data inquiry: 1973-74. Development of the SWRL English Language and Concepts Program for Spanish-Speaking Children (LCS). Los Alamitos, California: SWRL Educational Research and Development, 1975.

Hanson, R.A., Behr, G.E., & Bailey, J.D. SWRL Communication Skills Programs: Quality assurance information for the 1973-74 academic year (Technical Report 54). Los Alamitos, California: SWRL Educational Research and Development, September 1975.

Hanson, R.A., & Schutz, R.E. Instructional product implementation and schooling effects: Lessons from the second-year installation of the SWRL/Ginn Kindergarten Program (Technical Report 56). Los Alamitos, California: SWRL Educational Research and Development, June 1976.

Hanson, R.A., Schutz, R.E., & Bailey, J.D. Program-fair evaluation of instructional programs: Initial results of the kindergarten reading readiness inquiry (Technical Report 57). Los Alamitos, California: SWRL Educational Research and Development, July 1977.

Husén, T. International study of achievement in mathematics: A comparison of twelve countries. Vol. II. New York/Stockholm: John Wiley/Almquist & Wiksell, 1967.

Jenkins, J.R., & Pany, D. Curriculum biases in reading achievement tests (Technical Report No. 16). University of Illinois, Urbana, Illinois: Center for the Study of Reading, November 1976.

McDonald, F.S. Research on teaching and its implication for policy-making: Report on phase II of the beginning teacher evaluation study. Paper presented at the Conference on Research on Teacher Effects: An Examination by Policy-Makers and Researchers, sponsored by the National Institute of Education at the School of Education, University of Texas, Austin, November 1975.

Perkins, J., & Buchanan, A. Interrelating the content of instruction and the content of standardized test batteries: Method and and illustration (Technical Note 3-78-04). Los Alamitos, California: SWRL Educational Research and Development, 1978.

Popham, W.J. Educational evaluation. Englewood Cliffs, New Jersey: Prentice-Hall, 1975.

Porter, A.C., Schmidt, W.H., Floden, R.E., & Freeman, D.J. Impact on what? The importance of content covered. Paper prepared at the Institute for Research on Teaching, Michigan State University and presented at the meeting of the Evaluation Research Society, December 1977.

Rosenshine, B.V. Academic engaged time, content covered, and direct instruction. Paper presented at the annual meeting of the American Educational Research Association, New York, April 1977.

Stallings, J.A. What teachers do does make a difference: Implications of correlational findings for inservice teacher training programs. Paper prepared at the Stanford Research Institute, Menlo Park, California for presentation to the National Commission on Performance-Based Education, Washington, DC, September 8, 1976.

Walker, D.F., & Schaffarzick, J. Comparing Curricula. Review of Educational Research, 1974, 44 (1), 83-111.

Wilson, J.W., Cohen, L.S., & Begle, E.G. NLSMA Reports. Vols. 1-25. Stanford University: The Board of Trustees of Leland Stanford Junior University, 1968-72.